

THE ONTARIO WATER RESOURCES COMMISSION

Α

SUMMARY REPORT

OF

ARSENIC LEVELS

FOUND IN THE

MOIRA RIVER WATERSHED

April 1970

TD 427 .A77 S86 1970 MOE

DIVISION OF INDUSTRIAL WASTES

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TD A summary report of arsenic levels found in the Moira River Watershed.
80641

1970

Provincial Guidelines for Arsenic Levels in Water Supplies

Arsenic Content mg/1.

Comments

Less than 0.05

Suitable for drinking water. Water containing up to this level may be permitted for continuous use for all purposes eg., domestic supplies:

In my opinion short-term fluctuations may be permitted above this level. As a guide the fluctuations should not exceed three times this limit and should not persist any longer than 30 days in any 6 months period.

0.05 - 0.2

For summer camp use and for summer cottagers, the desirable level would still be 0.05 mg/l. In my opinion short-term consumption of levels up to 0.2 may be permitted for periods of 2 to 8 weeks by summer cottagers and campers.

1.0

Water containing this level should be rejected for human consumption.

SUMMARY REPORT

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LNTRODUCTION

The Onterio Department of Health, the Deloro Smelting and Refining Company Limited, and the Onterio Water Resources Commission have all smallysed samples from the Moire River for arsenic. The results are compiled in this report and an effort is made to interpret the data collected.

SAMPLING AND ANALYSIS

During the period 1951 - 1957, the only samples taken of the Moira River were those collected and analysed for arsenic by the Ontario Department of Health (ODH). In 1958, when a cattle kill was reported, the Ontario Water Resources Commission commenced its present sampling programme. In 1960, the Company started to report its analysis on samples collected and analysed in its laboratories. It had been the practice of the Company to take duplicate samples for comparitive purposes whenever the two Government organizations made a survey.

The samples which are submitted to the OWRC laboratories in Toronto are analysed by a medified Guitzeit method in accordance with the procedures described in "Standard Methods for the Examination of Water and Wastewater", 12th edition. Results are reported as milligrams per litre As and are accurate to \pm 0.01 mg/l. Those samples which are sent to the ODH laboratories in Toronto are analysed by the Silver Salt method. These are reported as milligrams per litre As₂O₃ and have an accuracy of \pm 0.05 mg/l.

During the past 8 years the Moira River at the plant site has been sampled on an average of 26 days per year by the three organizations concerned. Over the same period, the OWRC has obtained samples on an average of 17 days per year.

Routine monitoring of the water quality in the Moira River system is carried out by the Water Quality Surveys Branch of the Commission.

The sampling points in this programme are shown in the appended map.

RESULTS

The results for the samples collected from the Moira River above the abandoned plant site and downstream at Highway #7 are tabulated in Appendix I. Also included in Appendix I is a summary of the annual average concentrations at these points.

The results for all sampling points on the Moira River system are summarized on a monthly basis in Appendix II.

The frequency at which samples are collected from the Moira River is greatest during the summer and fall when the arsenic concentrations are highest. Thus calculating a straight average of the results would give an unrepresentative average. In order to determine a more representative yearly average, the results were first averaged monthly and these monthly averages were used in determining an annual average. The annual average concentrations calculated in this manner are shown in Table I. Also, the annual average concentrations in the Moira River above the abandoned plant site and at Highway #7 are plotted in Graph #1 along with the annual average stream flow at Deloro.

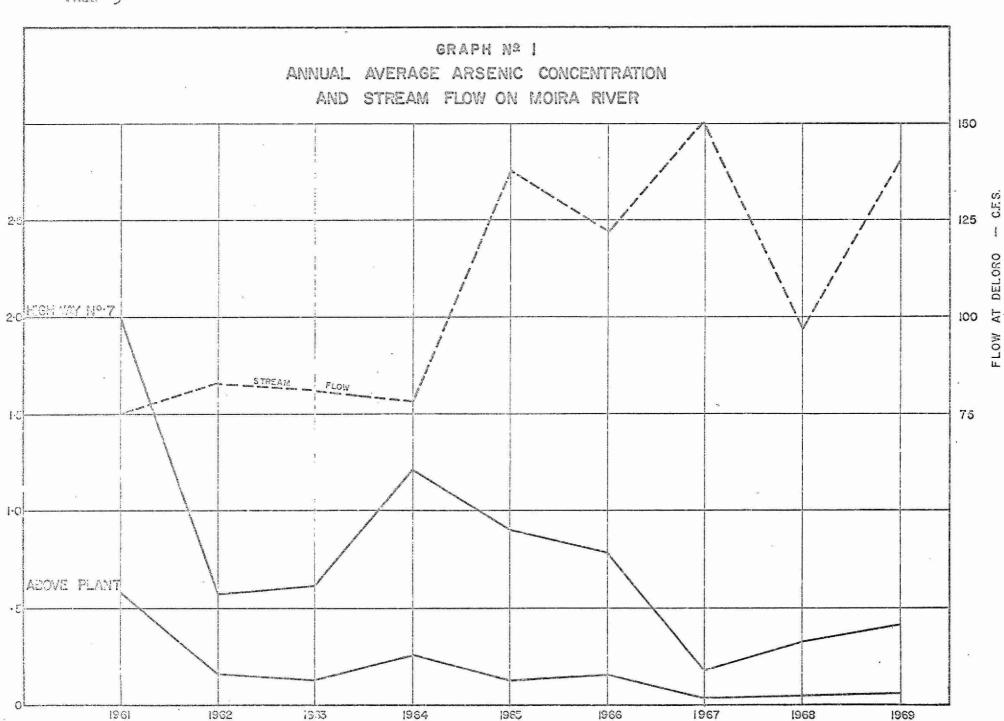


TABLE I

Water to the Control of the Control	a promise and appropriate and appropriate	-		-		
Miles from Bay of Quinte	1.964	1965_	1966	1967	1968	1969
•7				₩	.Ol	.03
3.9		-	-		.01	.03
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44.4	<u>-</u>	.08	y	-	.10	.13
57.6	1.21	.91	•79	.18	·34	.42
58.7	.27	•13	.17	.03	.05	.07

RIVER FLOWS AND ARSENTC LOADINGS

The yearly mean river flow in the Moira River at Deloro has remained within 75 - 151 cfs. Flows as low as 0.3 cfs. and as high as 1150 cfs. have been recorded at Deloro since the stream gauging station was intalled in October 1965. River flows at Deloro between 1959 and 1965 were estimated by extrapolation using the recorded flows at Foxboro and the ratio of the flows at Deloro and Foxboro from October 1965 until the present.

The arsenic loadings were calculated by using the concentration and flow on the day of sampling and averaging the loadings thus determined on a monthly and then yearly basis. These loadings are shown in Table II.

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TABLE II

ARSENIC LOADINGS
(LBS/DAY)

· · · · · · · · · · · · · · · · · · ·	196		196	and the state of t	196		196	8	196	59
MONTH	Above Plant	Hwy. #7	Above Plant	Hwy. #7	Above Plant	Hwy. #7	Above Plant	Hwy. #7	Above Plant	Hwy #7
January		-	0	84	10	10		28	0	-
February	-		22	74	23	35	3	27	0	41
March	-	***	21	184	11	70	0	264	0	19
April	_		0	84	8	175	5	305	0	146
May	B-17	6 47	18	73	5	206	8	37	63	292
June	-	-	4	27	0	83	6	115	10	74
July	-	-	3	6	3	33	2	43	4	20
August	-	-	1	8	3	13	3	25	7	51.
September	***	•••	3	7	2	11	9	111	2	1.4
October	172	343	1	4	-	8	4	15	4	17
November	0	50	10	71	0	208	8	67	0	192
December	13	264	0	215	0	0			1.0	194
AVERAGE			7	70	5	70	5	94	8	96
AVERAGE INCREASE			63		65		89		88	Commence of the Commence of th

DISCUSSION OF RESULTS

The general trend of the arsenic concentration in the river both above the abandoned plant site and at Highway #7 has been towards lower levels. This may in part be due to the higher stream flows which occurred during the same period.

Arsenic occurs naturally in the Moira River as is indicated by its presence as far upstream from the plant site as Malone in concentrations as high as 0.03 ppm. Over the past 9 years at a point just above the abandoned plant site an average yearly concentration of 0.21 ppm has been observed. However, the values obtained over the past 3 years have been considerably lower averaging 0.06 ppm.

The arsenic concentration in the river rises considerably in passing through the abandoned plant site as is evidenced by the samples collected at Highway #7. The 9 year average concentration at Highway #7 (N-57.6) is 0.85 ppm, but the concentrations at this point during the past 3 years have also dropped considerably, the average being 0.31 ppm.

In the 13.2 river miles downstream of Highway #7 (M-57.6) to the brdige on Moira Lake (M-44.4) the arsenic concentration drops to an average value of 0.12 ppm.

The Skootamatta and Black Rivers join the Moira River about 1 and 1.3 miles downstream of Moira Lake. The concentration of arsenic in the Moira River downstream of these influents remains within the OWRC drinking water quality objective.

A part of the reduction noted at Highway #7 between 1966 and 1967 is believed to have resulted from the installation of the waste treatment works by Deloro Smelting and Refining Company Limited and placed in operation in late 1966. These works treat the water flowing in the New Westerly Creek which picks up contaminated ground water from the

abandoned plant site. Arsenic is precipitated by the addition of ferrous sulphate and then settled out in ponds.

Trenches were dug by the Company in 1969 to try to locate other sources of arsenic contaminated ground water gaining access to the river. Two flows believed to contain in the order of 20 to 40 lbs/day of arsenic were intercepted. These were directed to the treatment works in the latter part of the year. Insufficient data has been collected to date to determine if the treatment of these contaminated ground water streams will have a significant effect on the concentration in the river.

The programme of intercepting contaminated ground water streams for diversion to the waste treatment works is to continue in 1970.

CONCLUSIONS

The annual average concentration of arsenic in Moira Lake has been found to be in the order of 0.12 ppm or two to three times the maximum recommended in the OWRC drinking water quality objectives. It is hoped that the concentration can be reduced to less than 0.05 ppm with the present programme being carried out by Deloro Smelting and Refining Company Limited of intercepting contaminated ground water streams and directing these to the waste treatment works. It is expected that this programme will be completed this summer.

APPENDIX I

A Tabulation of All Arsonic Results for Samples
Collected From the Moira River Above the Plant
Site and at Highway #7

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1958	.17*		.32	1.79*		2.01
1959	.02*		.29	.26*		.98
1960	1.2%		.78	2.67*		.50
1961	.58	.54	.37	2.01	1.43	.87
1962	.16	.27	.40	.57	.71,	.17
1963	.13	.17	.04	.62	.62	.19
1964	.27	.35	.35	1.21	1.53	.57
1965	.13	.10	.03	.93	.79	.12
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1968 ABOVE PLANT HIGHWAY # 7

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PAGE - 12 - ARSENIC AS As (PPM)

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Apr. 17	0	0	.03	.07	.05	.04
May 5	0	0	.04	.03	.03	.08
May 22	.02	0		.07	.06	
June 1	0	0	.03	.03	.05	.03
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Sept. 4	8	.60	.67	2.3	1.50	1.67
_Sept18	53	60		1.8	1.80	
Oct. 9	.40	.75	.51	2.0	1.67	1.65
Oct. 13	.32	•75		2.0	1.80	
Nov. 6	.10	.11	.20	2.1	1.80	3.35
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May 31				.08		
June 13		.09	.03	.50	.24	.10
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June 27	15	1.5			.45	
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July 11	.38	.33	.03	1.11.	1.17	.20
July 20				1.50		
_July_25	38	.38		1.14	.83	
July 28				0		
Aug. 3				1.0		ļ
Aug. 8	.20	.30	.05	1.0	1.36	
Aug. 17				5.0		.47
Aug. 18				5.0		
Aug. 22	•	.65			6.82	
Sept. 5	40	.22	.0/.	<u>4.0</u>	2.27	.10
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PAGE - 15 - ARSENIC 1964 ABOVE PLANT

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Apr. 11	0	0	.03	.05	.12	.03
Apr. 25	0			.03		
Apr. 26		0			.12	
May 9	0	0	.03	.03	.15	-,04
May 23	.02	0		.10	.09	
June 6		0	.03	.20	.3.5	.05
June 20		.03			.24	
June 24	.03		.17	.20		.20
July 4		.82			.51	
July 18	.03	.11		•59	.90	
Aug. l	.25	.48	•39	.74	1.50	.79
Aug. 15		.70			1.59	
Aug. 29		1.06			4.23	
Sept. 12	.79	.98	.98	4.9	7.95	2.35
Sept. 26	7.1	1.06	ļ	4.2	6.00	
Oct. 9	1.36	1.14	.98	4.9	4.92	1.58
Oct. 24		1.36			4.16	
Nov. 7	1.36	.98		6.4.	3.41	
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July 13	.69	.60	.07	1.6	1.50	.47
July 21		.38			.75	
July 27		.53			1.20	
Aug. 3	.45	.53	.08	1.8	2.10	•59
Aug. 10		1.20			3.00	
Aug. 17		.53			2.40	
Aug. 24		.60			2	
Aug. 31	•	.60			2	
Sept. 7		.90			2.70	
Sept. 14	.04	.06	.03	1.5	2.60	.59

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1963 (cont'd) ABOVE PLANT

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Mar. 10	0	.06	.03	0	.24	.05
Apr. 7	0	0	.03	100	.08	.03
May 12	0	0	.03	.04	.15	.03
June 2	0	.03	.03	.3	.42	.04
June 16	00	.05		.3	.55	
July 7		27	.10	.4	.73	.29
July 21	.5	.73		.4	1.4	
Aug.4		30	.03	1.0	1.2	.20
Aug. 18	.36	.23		1.3	2.4	
Sept. 8	1.5	1.50	.05	3.0	2.6	.38
Oct. 13	0	.07	.05	1.00	1.70	•79
Nov. 11	00	.02	.03	30	.27	.10
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Feb. 8	and the second s	.27		· · · · · · · · · · · · · · · · · · ·	.53	
Feb. 23			.98			2.05
Mar. 15		.09			.21;	
Mar. 27	and the same of th		.75			3.80
Apr. 6			.03			
Apr. 11						
Apr. 19	0	0	.36	<u></u>	18	.08
_May_ll	<u> </u>	0	-06		.15	.05
June 2			.03	.2	.18	.03
June 21	.04	.03		.2	.24	ļ
July.5	.08	-06		.7	-49	<u> </u>
July 10			.03			J.,
July 11		.05			38	
Aug. 9		90	.05	.72	•74	10
Aug. 23	36	90		4.2	2.5	
Sep.t 6	2.6	1.8	.38	2.8	2.6	.60
Sept. 20	1.6	1.8		2.5	3.3	
Oct. 4	3.0	2.4	.30	9.0	5.3	.69
Oct. 18	<u>).8</u>	2.1		7.5	5.3	
Nov.]	1.8	1.5	.90	9.0 .	4.2	1.97
Nov. 15].0			6.0	1	
Dec. 4			.10	5	<u> </u>	.10
Dec. 16	.05	<u> </u>		.6	<u> </u>	
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PAGE - 20 - ARSENIC AS As (PPM)

1960	ADUVE	PLANI		TALES IN SACE A 100 M.				
DATE	OWRC	DELORO	HEALTH	OWRC	DELORO	HEALTH		
Jan. 21			.03			.30		
Feb. 17			.01			.21		
Apr. 21			.10			.25		
May 5			.01	4		.20		
May 10	0			.23				
May 31			.10			.60		
June 23			.03			.20		
July 18			.30			.30		
July 28	1.2			3.0				
Aug. 23	٠		. 5]			.70		
Aug. 23			.90			1.36		
Sept. 12			2.20			. 98		
Oct. 19			3.0			4.0		
Nov. 4	2.4		2.4	L.8				
Nov. 7			1.59			9.0		
Dec. 29	and the state of t		.10			.98		
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ARSENIC AS As (PPM)

1959

ABOVE PLANT

HIGHWAY 非 7

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DATE	owrc	DELORO	HEALTH	OVARC	DELORO	HEALTH
Jan. 14	0			0		
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Feb. 18			12	Control of the second of the s		
Mar. 18-			.01			.10
Apr. 16			.01		·	01
May 6	.03		.02	.13		10
May 22	Company of the Compan		.05			.10
May 23	Charles of the Control of the Contro			.39		
June 18			.20		<u></u>	
July 21			. 4,8			2.53
Aug. 20			.90			3.60
Sept. 16		<u> </u>	.70		<u> </u>	2.20
Oct. 27			.90			2.05
Nov. 19			.10			.07.
Dec. 28			.01			1.0
						
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1958		PLANT	70 AU (1)		HWAY #	7
DATE	OWRC	DELORO	HEALTH	owrc	DELORO	HEALTH
Jan. 29	racing control of the		.01		-	1.67
Feb. 17			.01			.02
Mar. 27			.01			
Apr. 28			01			0]
June 2			0			04;
June 20			15			2.27
July 21	and the control of th		53			8, 86
Aug. 13	.20			17.4		
Aug. 18				58.0		
Aug. 22			1.09	12.1		28.4
Sept. 5			<u> </u>	12.9		
Sept. 19			.60		ļ	4.05
Oct. 21			.80			.91
Dec. 9	.1.5			.91		=
Dec. 18			.04			,60
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PAGE - 23 - ARSENIC AS As (PPM)

1957 ABOVE PLANT

HIGHWAY # 7

1957	convert in the enterior of the contract of the	F bs MIV I	The same of the sa	grantes and an experience of the control of the con	The second secon	Turned of Mathematical State of the State of
DATE	OWRC	DELORO	HEALTH	OWRC	DELORO	HEALTH
Jan. 8		,	.01			.01
Jan. 25			.02			.02
Mar. 22			.02			.02
Apr. 1.8			,02			03
May 3			.02			.02
May 31			.01			.01
July 5	a valles valendandes facile fa de proprieta como especial como que assess		01	****		
July 19			.01			01
Sept. 25			.01			.01
Nov. 8			.01			.01
Dec. 11			.02			.01
Dec. 24			.03			.01
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1956		I bas PTITY I	Arrest - was every - consiste	A STATE OF THE PARTY OF THE PAR	And the section of th	or the grade and the second
DATE	OWRC	DELORO	HEALTH	OWRC	DELORO	HEALTH
Jan. 6		and an action of the contract	.02			.01
Jan. 30		ļ	.02	Par (desemble)	7.	.03
Feb. 29			.02			O
Mar. 29		<u> </u>	.0.]			01
Apr. 20	Contracted States and contract contracts to contract the contract of contracts and con		.01			02
June 22			.02			
June 25						
July 20		<u></u>	.02			03
Ang. 31			.01			
Nov. 16			.01			.07
Nov. 30			.01			.01
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PAGE - 25 - ARSENIC AS As (PPM) 1955 ABOVE PLANT HIGHWAY # 7

1955	PALICIA V Co.	PLANI	gramma politica e recisionale de attochativo.	COMMENTS OF THE PARTY OF THE PA				
DATE	OWRC	DELORO	HEALTH	OWRC	DELORO	HEALTH		
Jan. 14			.02			.02		
Feb. 15	The second of the second desired and the seco		.01			.03		
Mar. 23			.01			.02		
May 6			.01	Y		.01		
May 27	and the beautiful to the second of the secon		.01			.01		
June 28			.02			.02		
July 29			.01		·	.05		
Aug. 23			.02			.03		
Oct. 13			.02			.03		
Nov. 3	-		.02			.01		
Nov. 23			.02			.01		
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PAGE - 26 - ARSENIC AS As (PPM)

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DATE	OWRC	DELORO	HEALTH	owrc	DELORO	HEALTH			
Jan. 21			0	-	8	0			
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Mar. 19			0			0			
Apr. 15			0			0			
May 17			0						
June 8			.02			.02			
July 14		annes de la colonidad de la co	0			.10			
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Oct. 28			00			0			
Nov. 17			0			.08			
Dec. 17			.01			,			
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	and delivery the second								
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PAGE - 27 - ARSENIC AS As (PPM)

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DATE	OWRC	DELORO	HEALTA	OWRC	DELURO	HEALTH
Jan. 5	geographics Education and Taylor (from 1966) Special	To general published the second of the secon	0			•07
Feb. 4			00			0
Feb. 27			.01			00
Mar. 19			0			.02
Apr. 1			0			.02
May 6			1.10			•01 _L
June 3	e de la composition de la comp		0			0
July 2			0			0
Aug. 5			0			.06
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PAGE - 28 - ARSENIC AS As (PPM)

1952	ADOVE	PLAN!		III GII VIII II I				
DATE	OWRC	DELORO	HEALTH	OWRC	DELORO	HEALTH		
Feb. 15	Names Language 1 toggesser han Farige Schlicher Schlicher Schlicher		.05	and the second s		.0ક		
Mar. 22			.03			0		
Apr. 29			.03			0		
May 2l			0			0		
June 25			0			0		
July 15			.02			./.		
Aug. 25	Company of the Control of the Contro		.06			1.50		
Sept. 25			0			.17		
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and the second s								
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PAGE - 29 - ARSENIC AS As (PPM)

1951	ABOVE	PLANT	HIGHWAY # 7						
DATE	OWRC	DELORO	HEALTH	OWRC	DELORO	HEALTH			
Feb. 7		And the Conference of the Conf	.05			.08			
Mar. 6			03			0			
Apr. 25			03		r	0			
May 19			0			0			
June 23			0			0			
July 11	A-1-3-1-3-1-3-1-3-1-3-1-3-1-3-1-3-1-3-1-	<u> </u>	.02			38			
Aug. 22	and the second s		.06			1.50			
Sept. 22			0			.17			
Oct. 29			0			.07			
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APPENDIX II

A Summary of the Monthly Average Arsenic
Concentrations for Samples Collected at
All Sampling Stations on the Moira River System

PAGE - 30 - 4

MOIRA RIVER

YEAR 1969

HILE ACH LAKE CATARA	si Jan.	FEB.	MAR.	APR.	MAY	JUNE	JUEY	AUG.	SEPT.	ocy.	NOV.	DEC.	LOCATION
· 2							112						VICTORIA PARK
.7		.02	.03	.Ol		.03	.02	.04	.07	.04			HWY Nº 2 BRIDGE
1.5		.02	.03	.02		.02	.03	.O.4.	.07	.04			SEWER EFFLUENT .
3.€	i	.03	.03	.02		.03		.05	.04	.05			CANIFTON BRIDGE
26.8						The state of the s							CHAPMAN'S BRIDGE
1, 27.2		.03		.03		.02	.04	.08	.11	-07			STOCO LAKE DUTLET
25-7		.02	.04	.03		.02	.02	.07	10	_06_			STOCO BRIDGE
31.0	1	.04	l	• OL ₊		.04	.04	.07	<u> </u>	.06		lv.	STOGO LAKE
31.2		,04	, O.L.	.03	04 7 mm	.04	.04	,05	.02	.05			TWEED
32.0	i :		ı	.02	1 1 1 1		-01		·	.02			CLARE RIVER
32-8		i		.02			.Ol			.02			SULPHIDE CREEK
57.7	;		.02	.01	And the second s	.02		.04	.01				SKOOTAMATTA RIVER
· O				.Ol									BLACK RIVER
. s' c, · A;		.0ಕ	.03	.01		.11	.12	.36	.21	,22	.29		MOIRA LAKE
45.4	3									.02			DEER CREEK
-43-8			.02	0		-01		-01	.01				DEER CREEK
57 ⋅€		.08	.06	.05	.14	.15	.16	1.84		1.22	.52	.18	HWY Nº 7
53.7	0			0	.03	.02		.10	,14	.52	0	.02	ABOVE PLANT
¢2.€			İ										DOWNSTREAM OF MALONE

PAGE - 31 - '

MOIRA RIVER YEAR 1968

MILES ACON LAKE OKTARIO	JAH.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	oct.	NOV.	DEC.	LOCATION
ı ·2					t to define the control of the contr	Commentation Constitute Total							VICTORIA PARK
.7			.01	0	.01.	.01	.01	.30	0		.02		HWY Nº 2 BRIDGE
115			.03	0	.01	.02	.01	.20	0		.02		SEWER EFFLUENT
5-9			0.	0	.01	.01	.01	.02	0		,		CANIFTON BRIDGE
20:0												·	CHAPMAN'S BRIDGE
ā:·2				.0	Ol	.01	0	.03	0		.03		STOCO LAKE OUTLET
20-7	0.	.77		0	.01.	.02			i o		.05		STOCO BRIDGE
31-0									,		.02	**	STOCO LAKE
31-2	0.	0.		0	.01	.03	0	.02	0	The same and the s	.03		TWEED
₹2÷0			.03	0			0	The state of the s	1	-			CLARE RIVER
32∙3				0 -			.10						SULPHIDE CREEK
37.7			.01	0	0	.01	0	0	0	•	0		SKOOTAMATTA RIVER
37-0 ,				0									BLACK RIVER
44.4	.05	.05	.c6	.05	.06	.09	.10	.13	.12		.26		MOIRA LAKE
43-4)#i						DEER CREEK
46-5		1 1 1 1	О	0	0	.01	0	.01	0		.02		DEER CREEK
57 - 6	.03	.07	.29	.10	.08	.26	.22	.97	94.	. 56	.22		HWY N27
59-7		.01	0	.01					.09_		.03		ABOVE PLANT
62.6		, ,,,,						!					DOWNSTREAM OF MALONE

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MOIRA RIVER

YEAR 19 67

MILES FROM LAKE ONTARIO	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	LOCATION
.2				1 L. (10 - 10 - 10 - 10 - 10 - 10 - 10 - 10					i i				VICTORIA PARK
.7										0	0	0	HWY Nº 2 BRIDGE
. 1.5										0	0	0	SEWER EFFLUENT
3.0										0	0	_ 0_	CANIFTON BRIDGE
20.6			i				i i 1					the state of the s	CHAPMAN'S BRIDGE
27-2			0	. 0	0	0				.06	_ 0	.01	STOCO LAKE OUTLET
25-7	.02		.02		О	0			.04	0	0	0	STOCO BRIDGE
51·C													STOCO LAKE
31-2	:		<u> </u>							.05	0	0	TWEED
U& · 0	:							**		0			CLARE RIVER
22.9	· ·			! !						.05			SULPHIDE CREEK
7.7 - 7	4 5									0	0.	a	SKOOTAMATTA RIVER
50· G										0			BLACK RIVER
44.4								.21		.19	.17	.04	MOIRA LAKE
45.4				1	İ								DEER CREEK
46·5	1	-								0	0	0	DEER CREEK
57.€	.03	.c6	.13	.05	.19	.29	.11	.48	.42	.50	.13	0	HWY Nº7
50.7	.03	.04	.02	0	.01	0	·oı		.08		0	1_0	ABOVE PLANT
03-8													DOWNSTREAM OF MALONE

PAGE - 33 -

MOIRA RIVER

MILED HOW LAKE OF	OIRATE	JAN.	FEB.	MAR.	APR.	мау	JUNE	JULY	AUG.	SEPT.	ост.	NOV.	DEC.	LOCATION
			S. Andrewson States of the Control o											VICTORIA PARK
.7					0				10					HWY Nº 2 BRIDGE
1.5														SEWER EFFLUENT
3-9									.04			v		CANIFTON BRIDGE
26-3							1							CHAPMAN'S BRIDGE
27-2								0	.10			.02	0	STOCO LAKE OUTLET
29.7			***************************************					0	.06			.01		STOGO BRIDGE
31.0													٠.	STOCO LAKE
5!•2				0					.04					TWEED
32.0				2					.01					CLARE RIVER
52-8	· · · · · · · · · · · · · · · · · · ·								.02					SULPHIDE CREEK
57.7	:								.02	İ		94		SKOOTAMATTA RIVER
£3-0	[-			 					.02					BLACK RIVER
46.4	, per second								.18					MOIRA LAKE
£5-4	1													DEER CREEK
46-5									0					DEER CREEK
57.3	į	.75	.10	.18	.07	.05	.12	-24	2.00	1,55	2.00	2.30	.12	HWY Nº7
53.7	1	0	.03	.02	0	.01	.02	.14	.66	.67			0	ABOVE PLANT
CQ-8 ·				11:2		7. 32.1 (82.								DOWNSTREAM OF MALONE

MOIRA RIVER

												6 %
MILES FROM LAKE ONTARIO JAN	. FEB.	MAR.	APR.	мау	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	LOCATION
.2			.02		.04	.Ol		0			1	VICTORIA PARK
			.02		.01	.Cl						HWY Nº 2 BRIDGE
-7		 		1	.01		.05	O				SEWER EFFLUENT
1.6 (.01				.0l .0l	.03					CANIFTON BRIDGE
3.3			000		.02	i		0				CHAPMAN'S BRIDGE
25.0		.06	.03	0	102.	<u> </u>		ĺ				STOCO LAKE OUTLET
27-2	i	-			.04	.01	.13	0				STOCO BRIDGE
20-7		.06	.02		1 .04	1 .01		<u> </u>			η ,	STOCO LAKE
\$1+0 (.03	.10	.oı				TWEED
	1				1	.05	• 10	.01				CLARE RIVER
5% • 0		-			-			 				SULPHIDE CREEK
53/3			<u> </u>						1			SKOOTAMATTA RIVER
37.7	<u> </u>		-		1							BLACK RIVER
3t0		-		<u>i</u>	-					.20	1	MOIRA LAKE
44		03_	1_3	108	-07	1-10	-08	-03		1.20		DEER CREEK
-3.4		-			1		 	1		1	1	DEER CREEK
48-5							10.00	10.10	7 60			HWY Nº 7
57.6	.10	.20	.08	-10	.38	İ		3.40	1			ABOVE PLANT
53.7	0	0	.01	0		_ .38_	20		1.48	1-0-		DOWNSTREAM OF MALONE
82·G		0_	0	0	1 0							

MOIRA RIVER

YEAR 1064

MILES FROM LAKE CHTARIO	JAN.	7 <i>5</i> 3.	маз.	APR.	IŁAY	JUNE	UULX	AUG.	SIPT	ост.	NOV.	DEC.	LOCATION
· 2				.02		.04	.01.	.02	0				VICTORIA PARK
													HWY Nº 2 BRIDG€
1.5							.02	.01	0				SEWER EFFLUENT
3.9							.02	.04	.04		£		CANIFTON BRIDGE
23.3		Name and Address					.02	.03	.02			1.6	CHAPMAN'S BRIDGE
G7·2													STOCO LAKE OUTLET
20-7				·	 								STOCO BRIDGE
31.0			1				.02	.03	.04				STOCO LAKE
51-2			1		İ		.Ol	.02	.01				TWEED
32.0			İ					1					CLARE RIVER
33.48							,						SULPHIDE CREEK
37.7					-								SKOOTAMATTA RIVER
0.43					 	1							BLACK RIVER
35.6			<u> </u>	<u> </u>			.03	06	.11.		.12		MOIRA LAKE
45.4	v	<u></u>					J						DEER CREEK
46-5			 	! 		.01	0						DEER CREEK
37.0	/0	·		, O4	.07	.20	.59	.74	1. 70	4.90	7. 90	55	HWY Kº 7
		.24	.03	0	.01	.02	.03	.25		1.36	.68	0	ABOVE PLANT
83.8	. 1.0	.04	.03		.0.1	1.02		- 62		1	.15		DOWNSTREAM OF MALONE